In 1873, the chair of chemistry at Leyden becoming vacant owing to the retirement of van der Boon Mesch, Dr. van Bemmelen was elected into it, and Bakhuis Roozeboom became his assistant. The first ten years of the professorship were almost exclusively devoted to the chemistry of soils, and the results place van Bemmelen in the front rank of agricultural chemists. Thenceforward, from 1880 onwards, the rest of his long and active life was devoted to elucidation of absorption as a phenomenon of the colloidal state.

In this region van Bemmelen ranks as a pioneer, and his fame rests now, and must always rest, on his classical researches on the relations between the components in the hydrogels of various colloidal oxides.

The work is in the main experimental and descriptive. It embodies an enormous amount of exact observation which has not yet been fully assimilated into the general body of knowledge. In one marked respect van Bemmelen stands apart from the Dutch school of chemists. With the exception of an address on the application of thermodynamics to chemistry which he delivered when rector of the university of Leyden in 1889, van Bemmelen's work is non-mathematical. His colloidal work is the application of the old-fashioned descriptive and experimental methods to a new region. His first assistant, Roozeboom, and his second assistant, Schreinemakers, on the other hand, were purely of the thermodynamic school.

Van Bemmelen possessed great personal charm. No picture which the present writer has seen does justice to features which were singularly delicate and refined. As the descendant of an old Dutch family, he was somewhat of an aristocrat in altogether the best sense of the word. Although his devotion to science was intuitive and instinctive, it left space for many interests amid the "humanities." As his lifelong friend and colleague in the professoriate, Prof. Tiele said of him:—"Although an assiduous investigator in special fields of learning, van Bemmelen always bore in mind those greater questions the answering of which is the aim of us all."

W. B. H.

DR. JOHN ATTFIELD, F.R.S.

On Saturday, March 18, Dr. John Attfield passed to his rest, and scientific pharmacy lost one who had devoted much of his life and work to its advancement.

Born in 1835, Attfield, after the completion of his school education, became a student in the School of Pharmacy of the Pharmaceutical Society, and subsequently demonstrator of chemistry at St. Bartholomew's Hospital, a position which he occupied for eight years. In 1862 he graduated at the University of Tübingen. In the same year he was appointed director of the laboratory of the Pharmaceutical Society, and soon afterwards professor of practical chemistry, a chair which he filled for thirty-four years. During this long period Attfield devoted himself, with marked success, to the advancement of pharmacy and particularly of chemistry as applied to pharmacy. His industry and ability in this respect is attested by the long series, some seventy in number, of original articles that appeared under his name in the *Pharmaceutical Journal* and other journals, an industry and ability that was soon to be rewarded by the blue ribbon of science, the Fellowship of the Royal Society. Of his publications the most important, and that which undoubtedly had the most far-reaching influence, was his "Handbook of Practical Chemistry," a work which was quickly accepted, both in this country and abroad, as an ideal textbook for students of pharmacy.

But it was not by his scientific labours alone that Attfield accomplished so much for pharmacy. Himself an admirable organiser and possessing extraordinarily methodical habits, he took an active part in founding the British Pharmaceutical Conference, an association that has proved itself of inestimable value to pharmacy, and later the Institute of Chemistry. To the subject of pharmaceutical education he devoted much time and attention, and no more strenuous advocate could be found of the advantages that would accrue to pharmacy through the raising of the standard of education amongst its members. Further scope for Attfield's scientific ability and inclination presented itself in the editorship of the "British Pharmacopœia" and of two of its addenda. The pages of these works bear abundant testimony to the care and skill that was bestowed upon them.

To his students Attfield was a genial, kindly teacher, ready at all times to sympathise with them, to assist them in their difficulties, to encourage them by becoming a student himself, and to stimulate them by holding up to them an ideal towards which they should strive. Much as he accomplished directly, it was little compared with what he accomplished indirectly by organising others and directing their efforts. During the thirty-four years of his teaching career many hundreds of students passed through his hands; there is not one that does not owe a debt of gratitude to John Attfield.

HENRY G. GREENISH.

NOTES.

THE annual meeting of the British Science Guild will be held at the Mansion House on Friday, April 7, at 4 p.m. The Lord Mayor will preside, and the president (Mr. Haldane) and others will address the meeting.

MR. F. J. BRIDGMAN, demonstrator in zoology and curator of the zoological museum of the Imperial College of Science and Technology, South Kensington, has been appointed naturalist on the staff of the Plymouth Laboratory of the Marine Biological Association.

ALTHOUGH attacked by a destructive epidemic some two or three years ago, wood-pigeons have of late increased to such an extent that measures are being taken to diminish their numbers. Some letters have appeared in the public Press directing attention to pigeon diphtheria and its risk to man. Pigeon diphtheria, however, has nothing to do with human diphtheria; the micro-organism is quite different, and is probably very minute and a "filter passer."

AN influential deputation from the Royal Institute of Public Health waited on the Presidents of the Local Government Board and Board of Agriculture and Fisheries on March 16 to urge the necessity for appointing a Royal Commission for the purpose of inquiring into (1) the increase of vermin and the steps to be taken for their destruction; (2) the question of what creatures are or are not harmful to man and his industries; and (3) the safety and efficiency of the various viruses on the market and other means advocated for such destruction. Mr. Burns acknowledged the influential nature of the deputation and the importance of their representations, and promised consideration of the matters brought before him.

The Popular Science Monthly for March contains an interesting article, by Dr. Fielding Garrison, on Ehrlich's work on specific therapeutics and on "salvarsan" in particular. This drug, introduced under the name of "606," is an organic arsenic compound (dioxy-diamino-arsenobenzol), and has an almost specific curative effect on diseases caused by spirillar micro-organisms, such as relapsing fever and syphilis. For the latter a single dose often suffices to cure, whereas the ordinary mercurial treatment must be continued for months.

In a presidential address delivered before the Society of American Bacteriologists, Prof. Veranus Moore pleads for the inclusion of bacteriology in the curriculum of the schools for the masses. He argues that information concerning the cause of fermentations, the storing of nitrogen in the soil, the causes of the changes in food-stuffs, and the etiology of the common infectious diseases, is as important, or the acquisition of such knowledge of as much disciplinary value, as the study of the life-history of the denizens of the deep as now required in many, if not in most, biological courses.

We record with regret the death of Lord Airedale, on March 16, at seventy-five years of age. Lord Airedale, who was perhaps better known under his earlier name as Sir James Kitson, devoted himself to the construction of locomotives suited to the characteristics of the countries for which they were required. He was president of the Iron and Steel Institute from 1888 to 1890. In 1904 he was awarded the Bessemer gold medal "for distinguished services to the iron and steel industries of Great Britain." The University of Leeds conferred upon him the degree of Doctor of Science.

The necessity of a systematic investigation of the prehistoric antiquities in the Balkan Peninsula has been impressed upon English scholars by the important results which have already followed the partial examination of a few of the more promising sites. It is now recognised that this region holds the key to many problems beginning from the early age of Greece and extending to the period of the Byzantine and Bulgarian kingdoms. A new phase of Neolithic culture independent of that of Crete has been identified in Thessaly, and on the Adriatic coast the relationship between the Balkan peoples and those of southern Italy, which is indicated by recent discoveries, needs clearer definition. With the object of exploring these regions, an influential committee of Oxford and Cambridge scholars has been formed, with Dr. A. J. Evans as chairman, Prof. J. L. Myres as secretary, and Mr. Vincent Yorke, The Farringdon Works, Shoe Lane, London, E.C., as treasurer, who invite contributions to a project which is sure to command the approval of all who are interested in the prehistoric culture of the Ægean area.

The annual awards of the Royal Geographical Society have been made as follows. The two Royal medals have been awarded to Colonel P. K. Kozloff, who receives the Founder's for his explorations in Central Asia since 1883, and to Dr. J. Charcot, who receives the Patron's for his expeditions to the Antarctic continent, first in 1903–5, and second in 1909–10. The Victoria research medal has been awarded to Captain H. G. Lyons, F.R.S., who was for many years the Director-General of the Egyptian Survey Department. During his tenure of office he carried through the cadastral survey of Egypt. Captain Lyons is at present lecturer in geography at the University of Glasgow. The Murchison bequest has been awarded to Dr. Wilfred Grenfell for his many years' work in Labrador. The Gill memorial goes to Captain G. E. Leachman, of the Royal Sussex Regiment, for the journey he made last year in north-eastern Arabia. The Back bequest goes to Dr. Arthur Neve, who has resided in Kashmir for many years, and devoted himself to the investigation of the Himalayas. The Cuthbert Peek fund has been awarded to Mr. R. L. Reid, who, during his six years' residence in the northern portion of the Congo State, carefully mapped the whole of the Mobangi River.

We regret to record the death of Dr. Otto Puchstein, secretary of the Imperial Institute of Archæology in Berlin, and one of the leading authorities on classical archæology, especially in its relations to Western Asiatic culture. Dr. Puchstein, who was born in 1856, studied archæology in Strassburg, and it was while he was still at the University that he undertook a careful examination of the Greek inscriptions which had been brought back by Lepsius from Egypt, his resulting dissertation obtaining him his doctor's degree in 1880. His first journey in Kurdistan, which largely determined the trend of his later studies, took place two years later, when he was commissioned by the Berlin Academy to report on the tombs recently discovered by Herr Sester, the engineer. The direct result of this report was the organisation by the Academy of a more important expedition to Asia Minor, on which Puchstein accompanied Prof. Carl Humann and Prof. von Luschan. The work recording the results of the expedition, entitled "Reise in Kleinasien," and illustrated as it is from most successful photographs, is still our principal authority for the remains of Hittite art. In his brochure "Pseudo-hettitische Kunst," and his suggestive studies of the origin of the Ionic column, he made full use of his wide acquaintance with eastern archæology. Of his other works, the most important were his monograph, in two volumes, on the sculptures of Pergamon, and the work, produced in collaboration with Dr. Robert Koldewey, on the remains of south Italian and Sicilian temples. Since 1885, in addition to other duties, he had held the post of assistant director of the Royal Museum in Berlin.

In *The Fortnightly Review* for March, Mr. W. S. Sparrow attempts to solve the problem how the primitive round house became square and oblong. He traces this transition from the period of the long barrows through the bee-hive houses on the island of Skellig Michael in Kerry. The necessity, as agriculture developed, of forming a winter shelter for cattle, led to the adoption of the oblong shed, the ends of which were supported by the forked tree known as gavel or crutch. This form of shed architecture came gradually to be extended to the round family hut as the needs of social life gave rise to the demand for larger roofed structures, which could not be provided in the circular building, and as the growth of the power of the chief made it necessary for him to sit on a dais at some distance from his retainers. The adoption of the crutch as a roof support naturally led to the practice of doing away with the curved spaces at the sides of the house by flattening the outer wall, which, as in the lake village of Glastonbury, then came to be made of long hurdles.

Some of the papers in ser. 3, vol. xiii., of the *Anales del Museo Nacional de Buenos Aires* (of which we have just received a complete copy), having been already noticed in Nature as they were separately issued, it will suffice to refer to an article on totemism, by Prof. L. M. Torres, which forms the concluding portion of the volume. This contains a long review and collation of the various theories and opinions as to the origin, signification, and effects of the totem cult, together with the author's own views and conclusions.

In the course of a note on the local seals in *The Irish Naturalist* for March, Dr. R. F. Scharff states that a seal which lived for some time in the Dublin Zoological

Gardens, and was taken in Galway Bay in 1895, turns out to be *Phoca foetida*, a species of which there appear to be extremely few previous British records. Dr. Scharff refers to certain dental characters by which the ringed seal may be distinguished from *P. vitulina*, but omits to mention a much more important difference between the two. In the common seal the two branches of the lower jaw form a very short union in front, but in adult specimens of the ringed seal the symphysis is of great length, almost recalling, in miniature, that of a sperm-whale. So great is the difference in this respect between the two species, that it affords considerable justification for Gray's generic separation of the ringed seal.

Two papers on armoured dinosaurs have recently appeared in *The American Journal of Science*. In the first (December, 1910) Mr. R. S. Lull describes the skeleton, or rather the compound skeleton, for it is made up of two individuals, of *Stegosaurus ungulatus*, recently mounted in the Peabody Museum of Yale University. This is claimed to be the first reconstructed specimen with the bones in their proper position, and with the dorsal plates in two parallel rows. A restoration of the external form of this strange reptile is also attempted. In the second paper (February, 1911) Mr. G. R. Wieland suggests that even Mr. Lull's restoration is incomplete, for he claims to have evidence of the existence of a series of low pleural keels in addition to the large dorsal plates. In this communication Mr. Wieland furnishes additional particulars with regard to the dermal plates and other remains described under the name of *Hierosaurus sternbergeri*. These, it is stated, indicate a reptile of about 5 metres in length, and therefore about half the size of Stegosaurus. Possibly they may prove generically inseparable from the previously named Stegopelta.

WE have received a copy, bearing the date of May, 1910, of an important memoir, by Dr. O. Abel, on the early Tertiary rhinoceroses of Europe, published as part iii. of vol. xx. of *Abhandlungen der k.k. Geologischen Reichsanstalt*, Vienna. The author adopts the view that the rhinoceros group should be divided into three families, namely, Hyracodontidæ (including Hyrachyus as well as Hyracodon), Amynodontidæ, and Rhinocerotidæ, each of which has undergone divergent development. No fewer than four new generic terms are proposed for the European early Tertiary representatives of the latter, the first two of these being based, respectively, on Cuvier's *Rhinoceros minutus* and Filhol's *Aceratherium minus*, while the other two are established as new species, one from the lignite of Monte Bolca and the other from the Oligocene of Krain. Special classificatory importance is attached to the fourth upper premolar, of which the oldest type is found in Hyrachyus, where the two cross-crests converge on the inner side to form a **U**-like loop. From this we find a gradual transition in the early Tertiary European forms to the modern Rhinoceros type, in which the last molar has become molariform with sundered and parallel cross-crests. Progressive increase in the complexity of the upper molars is likewise noticeable. The proposed emendation of the name *Prohyracodon orientalis* to *P. orientale* is uncalled for.

THE fourth volume (185 pp.) of Papers from the Tortugas Laboratory of the Carnegie Institution of Washington contains three contributions:—(1) An account, with text figures, by Prof. H. S. Pratt, of the anatomy of *Monocotyle floridana*, a new monogenetic trematode from the gills of the whip-ray (*Myliobatis freminvillei*). (2) A systematic survey of the trematodes of the Dry Tortugas, by Prof. E. Linton, in which are described, and figured on twenty-eight plates, thirty new genera and eleven new species of previously known genera. The author, while disposed to regard the generic limits proposed by modern helminthologists as being too narrow, is not prepared to suggest, at present, any change in the conception of what should constitute a generic character in the Trematoda; he has chosen to make this large number of new genera, all of which, except three, are represented by a single species, rather than to extend the limits of those already known. (3) Dr. Wayland Vaughan's contribution to the geological history of the Floridian Plateau, which he traces from Lower Oligocene time to the present, includes detailed studies on the geology, topography, bottom deposits, and on the transporting agents and their effects. The account is illustrated with maps, figures, and photographs.

THE March issue of *The Naturalist* contains a revised check list of British earthworms, by the Rev. Hilderic Friend. It is nearly twenty years since the previous list was issued, and in the meantime a dozen new species have been discovered by the compiler, and several important varieties. The additions to the former list include *Aporrectodea similis*, Fr., found at Kew last year, and described in *The Gardeners' Chronicle* of August 6, 1910; also *Dendrobaena submontana*, Vej., *Octolasion intermedium*, Fr., from Oxford, *Eophila icterica*, Sav., from Cambridge and Chelsea, *Allolobophora alpina*, Rosa, and *Allurus hercynius*, Mich., from Scotland, and the two interesting worms *Allolobophora hermanni*, Mich., and *Helodrilus oculatus*, Hoffm., which Michaelsen in his "Tierreich" regards as one and the same species. The list contains thirty-five species, besides several varieties, chiefly under the heading of *Eisenia veneta*, Rosa. One entirely new name also appears, but it is at present doubtful whether *Helodrilus elongatus*, Fr., found last year in Cornwall, may not have to be relegated to another group. It may possibly be a Sparganophilus. The author has overlooked the fact that *Bimastus beddardi*, Mich., was found by himself in Ireland, but described as a variety of *B. constricta*, Rosa. As he is preparing a monograph of British earth- and water-worms for the Ray Society, he appeals for help to make his researches complete.

UNDER the title "The Native Camphor Trees (Cinnamons) of Australia," a paper was read by Mr. R. T. Baker, curator of the Technological Museum, Sydney, before the biological section of the Australasian Association for the Advancement of Science, held in Sydney in January last. In this paper the author endeavours to show that the Australian species hitherto recorded are all endemic, and makes use of anatomical and chemical characters as auxiliary to the morphological characters usually relied upon in discriminating between the species. The appearance of the paper itself will be looked for with considerable interest.

WE have received copies of *The American Review of Tropical Agriculture*, a monthly journal, still in its first year of issue, devoted to the agriculture of those tropical countries in which America is particularly interested. It is published in Mexico under the editorship of Dr. Pehr Olsson-Seffer at the price of 15 c., and is intended for scientific and technical communications rather than mere newspaper items. Nos. 5, 6, and 7, which have already come to hand, contain articles on rubber and on the desert rubber-bearing plant, guayule (Parthenium).

THREE bulletins received from the Bureau of Entomology of the U.S. Department of Agriculture deal with insect pests of fruit trees. Mr. Hammar describes the life-history of the codling moth, *Carpocapsa pomonella*, in north-western Pennsylvania. In Bulletin No. 80, part vii., are given details that must be observed in spraying for this moth and for the plum curculio. The details for spraying with paraffin oil and other washes against the scale insects are set out in Bulletin 80, part viii. In another Bulletin (No. 82) are notes on the cucumber beetles, Diabrotica sp. Circular 122 describes the work done in combating the cotton-boll weevil, perhaps the most expensive insect in the States.

WE learn from the Journal of the National Poultry Organisation Society, No. 1, vol. v., that considerable progress has been made during the last twelve months in organising the industry. Indeed, Mr. Brown estimates that we now produce 5,000,000*l.* per annum more eggs and poultry than fifteen years ago. In Ireland particularly great advances have been made, and at the present time the production is considered to be *pro rata* greater than in any other country. Wales and Scotland are, however, only now awakening to the possibilities in this direction. The supply of cheap foreign eggs apparently cannot be relied upon to continue indefinitely, and increased home production is considered necessary if an egg famine is to be avoided.

THE possibility of growing sugar beets in South Africa is discussed by Dr. Juritz in *The Agricultural Journal of the Cape of Good Hope* (No. 5, vol. xxxvii.). As the soils of Cape Colony are better supplied with potash than with other plant foods, in particular, lime, it seemed *a priori* probable that crops rich in sugar could be obtained, and this expectation has been realised. Beets have been grown containing 15 to 16 per cent. of sugar, and comparing very favourably with crops obtained in Germany and the United States. There still remain, however, a number of details to settle before definite steps can be taken to grow the crop on a large scale. All experience indicates that sugar beet is somewhat expensive to produce by reason of the labour and manure required.

THE reduction of timber supply through the destructive action of insect pests forms the subject of recent circulars (Nos. 127, 128, and 129) issued by the United States Department of Agriculture Bureau of Entomology. The annual loss is estimated at about 62,500,000 dollars, but part of this, at any rate, could be saved by utilising damaged timber as early as possible. Indeed, it is considered that the removal of insect-infested timber would do more than anything else to reduce the number of insects and strengthen the control. In Circular No. 125 some of the insects are described, and methods of control are suggested. Bulletin 94 deals with the injury done to chestnut telephone and telegraph poles by wood-boring insects, especially *Parandra brunnea*, Fab., the life-history of which is described in detail. The oak pruner, *Elaphidion villosum*, Fab., is described in Circular 130. It cuts off twigs and small branches, and sometimes even fells young trees.

ON looking through Indian forestry publications and records, it is evident that experience and opinions vary considerably with regard to the best methods for regeneration of forest trees from seed. Considering the great variety of trees and the diversity in soil and climate this is natural, and therefore actual records of observation and experimental seedling plantations are much needed. In the Indian Forest Records (vol. ii., part iii.), Mr. D. O. Witt discusses the sylviculture of *Hardwickia binata*, "anjan," with special reference to the Nimar district of the Central Provinces, and Mr. M. Rama Rao presents a note on the germination and growth of sandal seedlings. Mr. Witt adduces evidence for the contention that successful growth of anjan seedlings depends primarily on a sufficient water supply combined with shade during the hot weather; in addition, preservation is required from grazing, and fire protection is desirable. The paper also contains information with regard to localities, composition, and regeneration of anjan forests.

THE new interpretation, preferred by Prof. E. C. Jeffery, of the structure of certain coals, notably of bogheads, is elaborated, with evidence derived from microscopic sections, in the Proceedings of the American Academy of Arts and Sciences (vol. xlvi., No. 12). On the authority of the two famous French palæontologists Prof. C. E. Bertrand and Mr. B. Renault, the explanation has been accepted that boghead coals are largely composed of colonies of gelatinous algæ, to which the name *Pila bibractensis* has been assigned. This explanation is disputed by Prof. Jeffery, who asserts that the thinner microscopic sections prepared by improved methods reveal the presence, not of algæ, but of spores of vascular cryptogams. It is significant that the spore structure is more pronounced in American and Scotch boghead coals than in the bituminous schists originally investigated by Bertrand and Renault. Prof. Jeffery's interpretation has a wider bearing, inasmuch as it undermines the algal hypothesis of the origin of petroleum.

IN *The Times* of February 28 is a description of the falls of the Mayo Kebi river, furnished by Mr. P. Talbot, whose party are apparently the first Europeans to visit them. Rising in French Equatorial Africa a little south of the tenth parallel, this river plunges down cliffs some 60 feet high, and flows on to join the Benue river on its way to the Atlantic. These cliffs and the gorge below are of granite, and form part of the ridge which here separates the Niger-Benue basin from that of the Shari flowing to Lake Chad.

As a contribution to the hydrography of the basin of the Seine, M. E. Clouzot gives in *La Géographie*, xxiii., 2, an account of the inundations of Paris in the past due to high levels in the Seine. From the sixth century the banks have been submerged from time to time, but it was only in the middle of the seventeenth century that the question of adopting means for mitigating the results of these occurrences was actively discussed, largely owing to the damage wrought by the great floods of 1649, 1651, and 1658

DR GROLL in the *Zeitschrift der Gessellschaft für Erdkunde* for February discusses the imperfect representation of the ocean floor in the light of the comparatively few soundings which are available when the area for investigation is considered. Difficulties in accurately locating points of observation enter into the question also, but even so, if areas are selected where the most detailed surveys have been carried out, the material is sufficient to show that much of the uniformity shown in physical maps arises from over-generalisation or imperfect information.

MR. W. GOODFELLOW, who had to return from the British Ornithological Expedition in New Guinea on account of ill-health, communicated a short summary of his experiences to *The Times* of March 3. He describes the extreme difficulties met with in cutting a way through the dense forest in the low country near the Mimika river. Starting from this river, and pushing inland, it was found eventually that it would have been better to have followed a river lying farther to the eastward, since on reaching the head of the Mimika the expedition had to cut its way eastwards through the forest, a task which was still in hand when Mr. Goodfellow left. The snow-capped mountain range rose steeply from the country at its foot, and is inaccessible at most points. The heavy rainfall in this range causes the rivers to rise rapidly in flood, by which parties of the expedition were held up for days unable to move. In spite of such obstacles, and the flooded condition of much of the forest region, much careful mapping, both of the Mimika and other rivers, and of a part of the mountain range, has been effected. Collections of birds, mammals, and ethnological objects have arrived in England for study, but a large part of the material obtained has yet to be received, including the reptilian and entomological specimens.

THE Board of Agriculture and Fisheries has just published a memoir of the Geological Survey on the water supply of Sussex (supplement). The memoir contains much new information which has accumulated since 1899, when the original memoir was published. The subject is dealt with under the headings of rainfall, springs, and risks of contamination. Details are given of a large number of wells and borings, together with analyses of waters. A general index, covering the original memoir as well as this supplement, is included. Copies may be obtained, price 2*s.* 6*d.*, from any agents for the sale of Ordnance Survey maps, through any bookseller, or from Mr. T. Fisher Unwin, 1 Adelphi Terrace, London, W.C., who is the wholesale agent for the sale of Geological Survey memoirs in the United Kingdom (except in the County of London).

THE "Instructions to the Marine Meteorological Observers of the U.S. Weather Bureau" (third edition), a copy of which has reached us, are very complete, and contain much useful information for general readers interested in meteorology. Some photographs of types of fog in the vicinity of San Francisco are very noteworthy. Instead of several sets of observations required daily by the former log-book, only one observation daily (except in the case of storms) is now asked for, to be taken at Greenwich mean noon. This large reduction in the number of observations required has resulted, as was hoped, in a great increase in the number of observers, which now amounts to about 3000. These daily simultaneous observations taken over the entire sea are first plotted on charts for the study of weather changes as they actually occur; afterwards they are tabulated, according to months, in 5° squares of latitude and longitude, and published in the monthly meteorological charts issued by the Bureau and in the Pilot Charts issued by the Navy Department.

MR. G. W. PIERCE, author of "Principles of Wireless Telegraphy," goes into the question of the best arrangement of the circuits at a wireless receiving station in a paper which appeared in the January number of the Proceedings of the American Academy of Arts and Sciences. The distributed capacity of the antennæ is treated as localised to simplify the calculations, and the results obtained will be sharper and more definite than can be expected in actual practice. The author finds that best resonance may be obtained with two values of the wave-length of the receiving circuits either above or below that of the incident waves. He points out the advantage of a low-resistance detector circuit on account of the superior sharpness of the resonance effect obtained, and considers that what is now required is a low-resistance detector with a high efficiency which shall convert rapid into slow alternate or into direct currents.

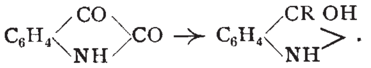
The Electrician for March 3 contains an abstract of a paper, presented to the Franklin Institute at Philadelphia by Mr. Carl Hering, in which it is claimed that a conductor carrying an electric current is subjected to a stretching force. In support of this statement, the author describes some of the well-known experiments, or modifications of them, in which a circuit carrying an electric current increases its area if any portion of the circuit is movable. The trough experiment of Ampère, in which a floating conducting bridge connecting two parallel troughs of mercury moves away from the ends of the troughs at which the current enters and leaves, respectively, may be cited as an example. The "pinch" effect, that is, the tendency of a liquid conductor carrying a current to contract in section, which was discovered by Mr. Hering, is given as a further proof of the stretching to which the conductor is subjected. In our opinion, the view taken by *The Electrician* in its leading article on the subject is the more natural one, namely, that the whole of the movements are explained by the repulsion by each other of the magnetic lines of force of the various parts of the circuits.

IN connection with the resistance-thermometer method of demonstrating the existence of the Peltier and Kelvin thermoelectric effects described by Mr. Starling in our issue of February 16, Prof. W. König, of Giessen, has directed our attention to two recent papers of his in the *Physikalische Zeitschrift* and in the *Archives* of the Swiss Société de Physique, in which he describes a very simple optical means of demonstrating the existence of the Kelvin effect. The material is a **U**-shaped wire, the bend of which dips into a mercury bath. The electric current passes down one and up the other side of the **U**, and its magnitude is so adjusted that the wire becomes red hot for a short portion of its length. The two red patches are found to be displaced upwards or downwards with respect to each other, according to the sign of the Kelvin effect in the material of the wire. Owing to the complicated nature of the heat losses from such a wire, Prof. König has not been able to make the method quantitative.

WE have received from Messrs. E. Leitz, of Wetzlar, and Oxford Street, London, copies of their catalogues of projection and photomicrographic apparatus. It is an indication of the importance at the present time of such appliances in scientific and educational work that these complete catalogues are compiled and issued separately. Until comparatively recent times such descriptions would have been included in a general catalogue; in fact, even now it seems to be reserved to foreign manufacturers to treat such matters with that thoroughness of which this is a typical example. The apparatus described is, in many cases, designed and constructed on established lines, but in others, particularly in the application of photography to micro-metallurgical work, the arrangements are both novel and ingenious. The ordinary worker is particularly indebted to Messrs. Leitz for introducing a small type of arc lamp, which is of great efficiency considering its small current consumption, may be used on any house supply without special wiring or fitting, and yet gives sufficient light for even the highest power photomicrographic work. Both optically and mechanically the products of the firm now take a high place, and an inspection of the apparatus referred to is sufficient to demonstrate that it is well thought out by those who have practical experience of the requirements of the worker in each particular branch.

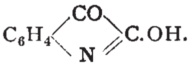
SOLID ammonium nitrite was isolated a year ago by Rây, who showed that small quantities of the salt sublime with decomposition when a dilute solution (0·7 to 2·0 per cent.), prepared by the interaction of silver nitrite with ammonium chloride or of barium nitrite with ammonium sulphate, is gently heated in a vacuum. It has now been shown by Messrs. Neogi and Adhicäry, of the Rajshahi College, Bengal (Journ. Chem. Soc., February), that the salt may be obtained in fairly large quantities by evaporating and subliming in a vacuum a very concentrated solution of ammonium chloride mixed with sodium or potassium nitrite. The evaporation is carried out in an exhausted distilling flask connected with a condenser and heated by means of a paraffin bath at 50°–60° C., the Geryk pump being worked constantly when the critical moment is reached at which solidification begins. The temperature is then raised gradually to 80°, when the solid nitrite begins to sublime, and forms a thick crust in the upper part of the flask. The salt, which was analysed by a variety of methods, is extremely hygroscopic, but may be kept undecomposed in an ordinary desiccator or in sealed tubes; in a vacuum desiccator the salt is decomposed by the action of the acid on its vapour. Ammonium nitrite is volatile with steam, and does not explode when reheated; vapour-density determinations at 100° showed that the salt had decomposed completely into nitrogen and steam.

AN interesting contribution to the chemistry of the indigo-group is described in the *Sitzungsberichte* of the Vienna Academy by Prof. M. Kohn, who has acted upon isatin with the Grignard reagent in various forms and obtained a series of aryl-derivatives of dioxindol,



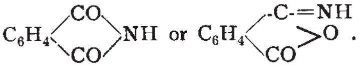
$$C_6H_4\left<\begin{matrix}CO\\NH\end{matrix}\right>CO \rightarrow C_6H_4\left<\begin{matrix}CR\,OH\\NH\end{matrix}\right>.$$

The action is remarkable in that only one of the carbonyl groups is attacked, a result that is perhaps due to the fact that isatin is more correctly represented by the formula



$$C_6H_4\left<\begin{matrix}CO\\N\end{matrix}\right>C.OH.$$

In this connection, it is noteworthy that a similar limitation is found in the case of phthalimide, a closely related substance, which may also be formulated in two ways as



$$C_6H_4\left<\begin{matrix}CO\\CO\end{matrix}\right>NH \text{ or } C_6H_4\left<\begin{matrix}C{=}NH\\CO\end{matrix}\right>O .$$

AN article on air-resistance to plane surfaces is contributed to *Engineering* for March 10 by Mr. A. W. Johns. The pressure on plates placed normal to the direction of relative motion has alone been considered. Values of K in the formula $P=KAV^2$, where P is the pressure, A is the area, and V is the speed, have been tabulated in the article from the results obtained by many experimenters. Square, rectangular, and circular plates are included. Mr. Johns compares the various results, and arrives at the following conclusions:—(1) The value of the coefficient K for the same plate decreases as the speed increases. (2) For rectangular plates, the value of K for the same speed and area increases as the ratio between the lengths of the sides increases, and this increase is generally in accordance with Hagen's formula, viz.

$$P=AV^2(0{\cdot}003+0{\cdot}00004q),$$

where q is the ratio of the sides of the plate. (3) For similarly shaped plates the values of K are the same at "corresponding speeds"; that is, the "law of similitude" can be applied to the motion of plates through the air. This law asserts that for exactly similar bodies the dimensions of which have a ratio L, exactly similar phenomena attend the motions if the speeds have a ratio $\sqrt{L}$. For example, Dines' result for a 12-inch square plate at 40 miles per hour is $K=0{\cdot}0029$. For a 60-inch square plate the "corresponding speed" would be $40\sqrt{\frac{60}{12}}=90$ miles per hour, at which speed K would have the same value, viz. 0·0029. Stanton's result for a 60-inch square plate is $K=0{\cdot}0032$ for speeds between 0 and 25 miles per hour.

BULLETIN No. 44 of the University of Illinois gives account of an investigation of built-up columns under load, carried out by Messrs. A. N. Talbot and H. F. Moore at the University of Illinois Engineering Experiment Station. In the laboratory tests, the amount and distribution of the stress over the cross-section and throughout the length of the channels or other component parts of steel and wrought-iron built-up columns were investigated. The stresses in the lattice bars were also determined. Deformation of the channel members was measured by means of Ames test-gauges mounted on suitable frames. These instruments magnify change of length by means of clockwork operating a hand rotating over a dial. They read directly to 0·001 inch, and by estimation to 0·0001 inch. The deformation of the lattice bars of one of the columns was measured by Ewing's well-known extensometer. The stress distribution both with axial and with eccentric loading was examined. Similar tests were conducted on the columns of a railroad bridge under the load of a locomotive and cars. It was found that considerable local flexural action exists in the channel or angle members of columns. Marked changes in the stress distribution were found at cross-sections short distances apart. Stresses 40 to 50 per cent. in excess of the average stress were measured. The distribution of stress among the various lattice bars was very irregular. The results show the futility of attempting to determine the stresses in the lacing of a centrally loaded column from theoretical considerations. No relation was found between the stresses observed and the stresses computed by any of the usual column formulas. Copies of this bulletin may be obtained gratis upon application to W. T. M. Goss, University of Illinois, Urbana, Illinois.

THE Aëronautical Society of Great Britain will publish immediately, as No. 6 of the Aëronautical Classics, "The Flight of Birds," by G. A. Borelli, which first appeared in 1680. This study of bird-flight has been translated from the original Latin for the first time into English by the editors, Mr. T. O'B. Hubbard and Mr. J. H. Ledeboer, and includes a biographical notice and reproduction of the original diagrams and illustrations. The six "Classics," including Cayley, Wenham, Walker, Lana, Pilcher and Stringfellow, and Borelli, can be obtained separately in paper covers at 1*s*. net, or in one bound volume, with a specially designed cover, at 7*s*. 6*d*. net.

MESSRS. WITHERBY AND CO. have in the press an illustrated volume entitled "Photography for Bird-lovers," by Mr. Bentley Beetham. The book will be a practical guide to the pursuit of bird-photography in all its branches.

OUR ASTRONOMICAL COLUMN.

THE SYDNEY OBSERVATORY.—From an extract from the Sydney *Morning Herald*, reprinted in the March number of *The Observatory* (No. 433, pp. 117–8), we regret to learn that the State Government does not intend to act on the recommendation made by the Public Service Board, two years ago, that the Sydney Observatory should be removed to a more suitable site and properly reorganised. This observatory was founded half a century ago on a site which was then suitable, but which is now enwrapped by the dust and smoke of a great city, and its possibilities otherwise vitiated by the thick haze overhanging Darling Harbour. The instruments are obsolete, and Mr. Raymond, the officer in charge, has to perform his various